

CHAPTER 3. AFFECTED ENVIRONMENT

Annual precipitation within the BHMA is 15 to 17 inches. The topography varies from rolling sagebrush-grasslands to steep precipitous drainages, scoria buttes and clayey outcrops with juniper and ponderosa pine uplands. Several intermittent drainages contain plains cottonwood and junipers. Springs and small wetlands are scattered throughout the BHMA. Livestock grazing, wildlife habitat, and limited mineral development are the historic land uses.

3.1 Air Quality

Air quality in the BHM area is considered very good, due to limited air pollution emission sources and good atmospheric dispersion conditions (BLM 2002). The main sources of air pollution are particulates from natural sources, vehicle traffic, surface coal mines, power plants, and oil and gas development. Occasional high concentrations of carbon monoxide and particulate matter occur within the developed areas of Campbell County. The Wyoming Department of Environmental Quality recognizing increasing particulate readings approached Campbell County, the coal mines, and the coal bed methane operators and has made a significant effort to reducing road-borne particulates (BLM 2002).

3.1 Land Uses and Land Use Capability

The lands are presently used for livestock grazing and wildlife habitat; mineral development is limited to a few abandoned drill holes. There are some springs, wetlands and intermittent riparian areas for water sources. Recreational hunting for trophy class mule deer has historically been excellent due to controlled access.

3.2 Cultural and Historic Resources

The Burnt Hollow Management Area is part of the Little Powder River corridor, an easy travel route between the breaks south of the Yellowstone River and the Cheyenne River drainage, a path east to the Black Hills, or south to the Platte. The BHMA lies east of the Little Powder River stream channel, south of the Cow Creek Road, is characterized by two ridge systems, and an interior valley, the drainage of Cow Creek. The drainage lends its name to the eastern ridge system, the “Cow Creek Breaks”. At this time, the western ridge lacks its own name, but contains a tributary to the Little Powder, called “Cedar Draw”, for the numerous junipers found there.

Cultural Settlement Patterns

Successful human occupation of the region involved a thorough understanding of the available resources, including water sources, travel routes, animal lifeways and probable weather patterns. The Powder River Basin has a dry climate, precluding farming or intensive cultivation of most plant crops due to the short growing season. Severe winters require planning and preparation for food, fuel and shelter, when game is less available. However, when summer restores grass and water, the wildlife returns in abundance, making the Powder River region a well-loved hunting ground.

Prehistoric

The earliest known human occupation in the region is the Clovis culture, people who hunted mammoth about 11,000 B.C. Evidence of several Paleoindian groups has been found north of Gillette, and these people probably traversed the BHMA. Research in the immediate vicinity of BHMA documents occupation by Middle Archaic peoples (5000-1000 B.C.) along the river corridor, succeeded by Later Archaic cultures (1000 B.C.-A.D. 500). A severe erosion cycle followed the Late Archaic period, stripping much of the sediment and the record of human occupation from this region. The Late Prehistoric occupation period (A.D. 500 to 1700) coincided with an expansion in the bison population. Once more distant peoples obtained the horse and access to Euro-American trade goods, they pressed into the bison lands of the high plains, interacting with the people already there.

Acquisition of the horse and improved weaponry allowed concentration on bison hunting, and a wider sphere of activity for the tribes who had them. Since the BHMA lies adjacent to the Little Powder, a relatively reliable water source, it probably offered a route of travel throughout human occupation. While a number of Native American groups may have traversed the region, at the beginning of the historic era, the tribes with long occupations in the region included the Shoshone, Arapaho, Blackfeet, Gros Ventres, Crow and Kiowa. People from the Missouri, including the Mandan, Hidatsa and Arikara, were familiar with the area. As population pressure east of the Missouri increased, the Cheyenne and Sioux moved onto the Plains.

Euro-American exploration of the region dates to the early nineteenth century, although French traders may have reached the area earlier. The Reynolds Expedition of 1859 passed through the general region, exploring the Belle Fourche and main Powder River drainages, but did not traverse the Little Powder. However, guide and mountain man Jim Bridger provided detailed information on the area. Better agricultural land and discoveries of precious metals elsewhere distracted attention from the region for several decades, and it became a reservoir for the Native American tribes affected by encroaching Euro-American settlement.

The Fort Laramie Treaty of 1851 did not assign the region to a particular tribe, but described it as common hunting grounds. Following the Civil War, Native American tribes battled with each other and the post-war Army for control of the region. At this time, the tribes known to occupy the region included the Shoshone, Arapaho, Blackfeet, Crow, Hidatsa, Arikara, Cheyenne and Siouian peoples. A later treaty in 1868 awarded the region to the Sioux, ignoring other tribal entities' use, leading to intertribal conflict.

Historic

Euro-American settlement came to the region with the establishment of military forts along the Bozeman Trail in 1866. While forts on the western edge of the Powder River Basin were abandoned following the Treaty of 1868, other forts were established. Army explorations continued. The resident Cheyenne and Sioux found themselves in conflict with the US Army and encroaching gold miners. Resistant groups who entered into

hostilities with the army and other tribes, leading to a number of military conflicts in 1876. By 1877, all the indigenous peoples had been assigned to reservations outside the Little Powder River drainage, and the area was open for Euro-American settlement. By 1880, cattle ranchers were expanding into the Powder River Basin.

By 1886, the ranges in Montana, Wyoming, and the Dakotas were overstocked, and a severe drought followed by a severe winter resulted in the collapse of the grazing industry. Ranchers restocked their ranges, bringing in large herds from Texas and the eastern plains. The trail bringing cattle from Nebraska into Wyoming and eastern Montana was one of the last, and was named the “Texas Trail”. A branch of this trail passed down Cottonwood Creek and joined the Little Powder just north of the BHMA. The 1890’s saw a fair amount of use of this particular trail. The Texas Trail is considered an eligible National Register site, but the trail corridor lies outside the perimeters of BHMA.

Homesteading lagged in the Little Powder River area until more desirable areas had been claimed. By 1922, the region had reached a historic settlement climax, but the period was followed by a cycle of drought, financial failure, and reorganization, which resulted in many farms and ranches being combined into larger units. Many small communities identified by their Post Office names disappeared with the diminishing population. Ranchers located on good water sources, or in possession of a mix of environmental zones, were able to hang on. Patenting of public lands continued into the ‘30’s, but ceased in this area with the passage of the Taylor Grazing Act, leaving much the present pattern of public and private land ownership. Oil and gas leasing of public minerals began in the late 1940’s, with development of these resources following about twenty years later. The coal mines south of the area are bounded by the “burn line”, and do not extend into the area. The former coal measures caught fire, burning out much of the subsurface coal, resulting in the local rugged scoria hills and parkland topography.

Cultural Inventory

Inventory in and immediately adjacent to Burnt Hollow totals 2300 acres, including 1600 acres surveyed for a Class II block sampling survey, 160 acres for nearby land exchanges, and 380 acres for oil and gas developments, not counting linear surveys for access roads and seismic lines. Of the 33 planned and 31 drilled oil and gas wells in the area, only 9 or 10 were inventoried for cultural sites prior to drilling; the other wells were located before cultural inventory was required under NEPA and FLPMA.

Cultural inventory in the area totals approximately 2300 acres of Class III inventoried acreage, distributed in the following townships within BHMA:

Township & Range	Acres in BHMA	Acres Inventoried	No.of Cultural Sites
T52N,R70W	3560	1235	1
T52N,R71W	10,320	902	1 *
T52N,R72W	210	None	1 *
T53N,R70W	160	40	0
T53N,R71W	2700	120	4*

*Historic road counted in three townships

Including contiguous sections, a total of 23 cultural properties have been recorded in the vicinity. These sites include: 12 lithic scatters, 10 campsites or occupations, and one historic road, now the roadbed of Highway 59, and the Texas Trail. Of these, only five are located within Burnt Hollow proper: 48 CA 732, 2532, 2533, 2534 and 3075. One occupation site has been determined Eligible to the National Register of Historic Places; another is of unknown eligibility. Two lithic scatters and the historic road have been determined Not eligible. Other prehistoric and historic era sites are known to exist in the SMA, but have not yet been recorded.

Research Potential

Cultural inventory in the area to date has not produced a comprehensive prehistoric or historic synthesis, but the potential is high. Some zones will be more productive than others, in that sediments will tend to be preserved in place, whereas other areas are subject to extensive erosion. There is good potential for locating sites which can provide information on the Late Archaic erosion cycle or event, as well as a more recent erosion/deposition cycle known as the Kaycee terrace. The drainage of Cow Creek contains deeply cut erosion channels; the age of these features will provide important information on regional environmental history. Several types of Late Prehistoric projectile points have been found in the general area, indicating the study area has potential to throw light on different, but contemporary, cultural groups using the same area.

Existing inventory has been accomplished through project-oriented surveys, focusing on a specific development or objective, usually mineral development or federal land exchanges. Project-driven inventory appears to under-estimate cultural potential in this area. A survey strategy oriented to environmental zones, water sources, soils, lithic resources, travel routes and overlooks may be more productive.

Native American Concerns

When the 60 Bar Land Exchange was proposed, all Native American tribes with known interest in the Powder River Basin were notified by certified letter, and their comments and concerns were requested. An information packet containing maps of the exchange and discussion of objectives was sent to each tribal group. At that time, the lands now known as Burnt Hollow Management Area were in private ownership. No written response was received from the notification.

Sites of Native American interest could include both prehistoric and historic sites, rock art, stone circles and cairns, constructs such as fortifications or vision quests, battle sites, burials, or localities which are sacred or part of tradition; such sites need not have man-made features, but have contexts preserved through song, prayer or oral history. There are presently no documented Native American sacred sites or traditional cultural properties in the immediate study area. Given the location of the study area adjacent to a major north-south travel route, and proximity to the Bear Butte and Bear Lodge sacred sites by way of other travel routes, there is potential for localities of significance to Native American groups.

3.3 Livestock Grazing:

Livestock grazing has historically been the dominant land use within the BHMA. Approximate allotment boundaries and fence lines are displayed in Figure 3.1.

The Missouri River Basin range survey (1957) rated the public lands within the allotment at 1650 AUMs. In 1999 an Ecological Site Inventory (ESI) was conducted. That inventory estimated 3593 AUMs available within the entire allotment. Based on BLMs more recent inventory and stocking rate determinations, the 1650 AUMs are a conservative estimate of the annual forage production. The 3593 AUMs over estimates the actual number of AUMs that are available for livestock to graze, as many areas are in steep terrain or too far from a water source to be grazed by livestock.

Figure 3.1 Approximate Allotment Boundary and Fence Lines within the Burnt Hollow Management Area, Campbell County, Wyoming.



The use authorized under the grazing lease is for 2400 AUMs with a variable season of use. Additional AUMs may be authorized after the Allotment Management Plan is implemented. Historically the allotment has been used as follows

The Big Pasture	November - May
Cow Creek Meadows	June - July
Burnt Hollow Pasture	July - October

The allotment is categorized as an "Improve (I) allotment". The criteria for the categorization are one or more of the following: large blocks of public land; range condition has been rated poor to fair or trend is static or downward; resource concerns have been identified, and opportunities exist for positive return on public investment in management planning and project development. The 60 Bar Allotment falls under this category due to the large block of public lands.

Some of the Range improvements on the allotment include:

#5138 Holler Well – T53N., R71W., Section 32

#6254 Lower Cedar Draw Spring and Reservoir – T53N., R71W., Section

#6255 Upper Cedar Draw Spring – T53N., R71W., Section

#6256 Bob Reservoir – T53N., R71W., Section

Other range improvements exist, but have not yet been surveyed.

3.4 Mineral Resources

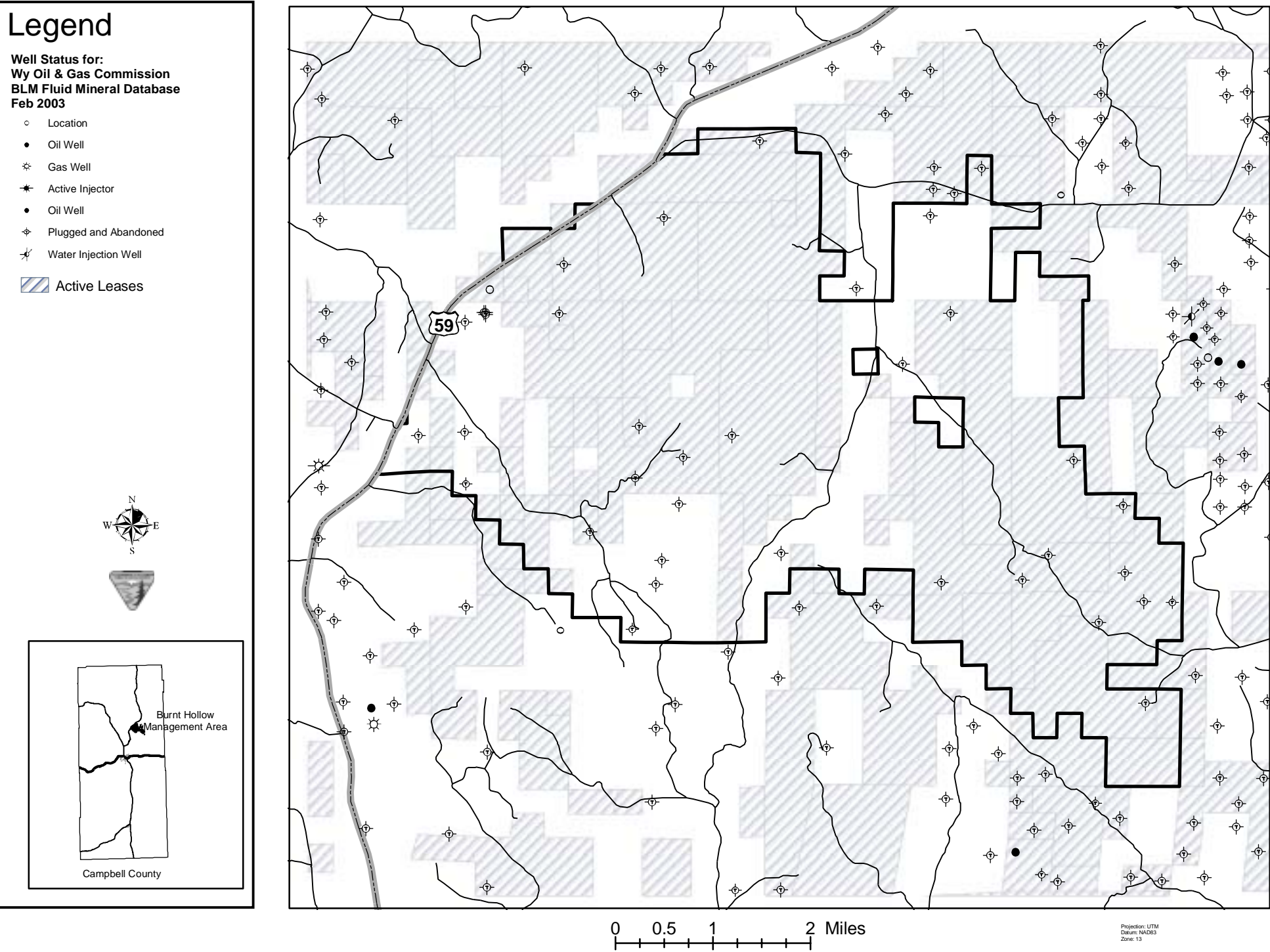
There are approximately 18,030 acres of potentially leaseable land in the Burnt Hollow area. Of the leaseable lands, 39 active oil and gas leases encompass approximately 13,700 acres while the remaining acreage is available for leasing (Figure 3.2). Approximately two-thirds of the leases contain lands both inside and outside the BHMA. Only one of the active leases is “held by production”, meaning the lease will continue to be held as long as it produces. The other active leases have expiration dates ranging from 1/31/2003 to 5/31/2010. Approximately 17 of these leases currently have timing stipulations, to protect sage grouse nesting habitat.

Additionally, there are approximately another 1730 acres of unleased Federal oil and gas minerals. In Wyoming, leaseable lands (i.e. leases that have terminated) are not automatically re-leased. A parcel must first be nominated for an upcoming sale. There are approximately 2600 acres within the Burnt Hollow area that the Federal government does not own the oil and gas rights. Approximately 1280 of these acres are owned by Wyoming.

Conventional wells:

Between 1960 and 1998, 31 conventional oil wells were drilled in the Burnt Hollow area, all were dry holes. The wells were typically drilled in the 1960's and 1980's as conventional Minnelusa tests. The typical total depth of the wells was between 8,000 and 9,000 feet. The deepest well drilled was 9300 feet. Most of the existing roads in the BHMA were developed or upgraded for these wells. There are producing oil wells

Figure 3.2 Mineral Status within the Burnt Hollow Management Area, Campbell County, Wyoming



within two miles of the BHMA on all sides.

Coalbed Methane Exploration:

In November 1997, an 800 foot coal bed methane well was drilled in Section 21, T. 52 N., R. 71 W. The operator originally reported that the Upper Wyodak coal seam was encountered at the surface, and the K-C coal seam was encountered at 458 feet below surface. A BLM review of the well logs indicates no coals were encountered. The well was dry, and was plugged in January 1998. There have been no other coal bed methane wells drilled within the Burnt Hollow area. The BHMA lies east of the coal outcrops (BLM 2002), and is believed to have limited potential for recoverable coal bed methane resources.

Nearest Production:

East: over one mile to the east of the Burnt Hollow area, in Sections 4 and 5, T. 52 N., R. 70 W., and Sections 33 and 34, T. 53 N., R. 70 W. Minnelusa production has been established since the 1980's.

South: approximately one mile to the south of the Burnt Hollow area, in Section 31 T. 52 N., R. 70 W, a Minnelusa well produced from 1979 to 1988, when it was abandoned. The Springen Ranch Muddy Unit was established in 1973 in the south central portion of T. 51 N., R. 71 W. The unit was terminated August 2, 2001 due to cessation of production. Since the early 90's Muddy production has been established in Sections 18 and 20, T. 51 N., R. 71 W.

West: slightly over one mile to the west of the Burnt Hollow area in Section 14 T. 52 N., R. 72 W, Minnelusa production has been established since 1982.

North: approximately two miles to the northwest of the Burnt Hollow area, in Section 18, T. 53 N., R. 71 W. Muddy production has been established since 1988. Approximately four miles to the northeast of the Burnt Hollow area, in Section 16 T. 53 N., R. 70 W., Minnelusa production has been established since 1985.

3.5 Recreation Resources

Prior to the land exchange recreational access was controlled by the private landowners; two BLM parcels of 80 acres each along the Cow Creek County Road and two BLM parcels of 40 and 400 acres along WY 59 were available for public use. Trespass from these parcels on to private property, and vandalism of fence and range improvements within these parcels are occasional occurrences. Access for big-game hunting was available through an outfitter whom leased the private lands and was permitted by BLM to hunt the public lands. Mule deer were carefully managed to produce trophy class antlers. The entire 18,600 plus acre BHMA is now available for non-motorized recreation use. A temporary motor-vehicle closure has been placed on the BLM administered public lands until November 1, 2003.

The few existing two-track roads within the BHMA were created for mineral exploration and/or livestock management. Two tracks along Provant Creek and within Hells Canyon

Draw originate on private property and remain inaccessible for vehicle use. The Windmill Road extends approximately one mile, from WY-59 (T 53N R 71W S 28 SW) into the southern half of section 33. The Cedar Draw Road was originally constructed for oil exploration, the road has received minimal maintenance over the years. This road parallels the southwestern boundary of the management area originating from WY-59, a spur road extends northeasterly into the center of the BHMA (T 53N R71W S 9 NE).

Both the Cedar Draw and Windmill Roads would require upgrading to meet BLM standards for public use. A number of water developments for livestock are scattered throughout the BHMA and may become available for recreational stock use. There are no other existing facilities that would be available for recreational use. Previous activities such as livestock grazing and fire suppression have created a network of smaller trails off of the main two-track roads into the rougher terrain which. Many remain visible today and offer access for recreation use.

3.6 Social-Economic

Campbell County is dependent upon energy development for much of its economic stability, producing more than 90% of the coal and 25% of the oil within Wyoming. Minerals and related industries employ the largest percentage of the Campbell County workforce. Presently there is a large amount of coal bed methane drilling and associated development taking place. Additional economic influence is present from local government, retail trade, services, and agricultural interests.

The 2000 population of Campbell County was estimated at 33,698 with 19,646 residents within the Gillette city limits (BLM 2002). The Campbell County population grew 14.7% between 1990 and 2000. The county's population is expected to grow another 4% by 2008.

3.7 Soils

A detailed soil survey is in the preliminary mapping stages for northern Campbell County (BLM 2003). A general state-wide soil map (STATSGO) indicates the BHMA to be within map units WY053 and WY127. WY053 comprises the east face of the Cow Creek Breaks, while the remaining of the BHMA falls within WY127. The three dominant soils within map unit WY053 are Shingle, Cushman, and Taluce; the three dominant soils within map unit WY127 are Kishona, Shingle, and Theedle. Shingle is a loam to clay loam commonly on slopes, erodes easily, and has poor revegetation potential. Cushman is a clay loam found on slopes less than 15%, it does not present an erosion hazard and can be revegetated. Taluce is a fine sandy loam on low to moderate slopes, it does not present an erosion hazard but is difficult to revegetate. Kishona is a loam on slopes less than 15% it does not present a severe erosion or revegetation hazard. Theedle is also a loam on more moderate slopes (3-40%) and also does not pose severe erosion or revegetation hazards. These soils are typical of semiarid grasslands. Generally they range from the clay dominated soils (i.e. Shingle) on the tops and sides of steep drainages to more silt and sand dominated soils (Kishona and Theedle) in the lower less steep areas.

3.8 Vegetation

The predominant vegetation types are prairie (52%), sagebrush-grassland (42%), and ponderosa pine (*Pinus ponderosa*) stands (4%) (Figure 3.3). Big sagebrush (*Artemisia tridentata* spp.) is the most common shrub, the most common grasses within the sagebrush communities include western wheatgrass (*Agropyron smithii*), needle and thread (*Stipa comata*), Indian ricegrass (*Oryzopsis hymenoides*), and prairie junegrass (*Koeleria pyramidata*). Rocky Mountain juniper (*Juniperus scopulorum*) is common within the sagebrush communities, particularly on hillsides and along drainages.

The prairies are level to rolling, predominant grasses include western wheatgrass, Indian ricegrass, needle and thread, blue grama (*Bouteloula gracilis*), and Sandberg bluegrass (*Poa sandbergii*). Common forbs include buckwheat (*Eriogonum umbellatum*), yarrow (*Achillea lanulosa*), and prickly pear cactus (*Opuntia* spp.).

The wetland and riparian areas contain plains cottonwood (*Populus sargentii*), juniper and sedges (*Carex* spp.) and rushes (*Juncus* spp.) at the springs and wetland areas. The upper slopes contain ponderosa pine/juniper, with an under-story of sagebrush, grasslands.

In 1999, an Ecological Site Inventory was conducted in association with the grazing allotment. The following is a summary of the number of acres of each seral stage (ecological condition):

Acres per Seral Stage					
Potential Natural Community	Late	Mid	Early	Unclassified	Total
1219 (8%)	8155 (52%)	2489 (16%)	221 (1%)	3475 (22%)	15560*

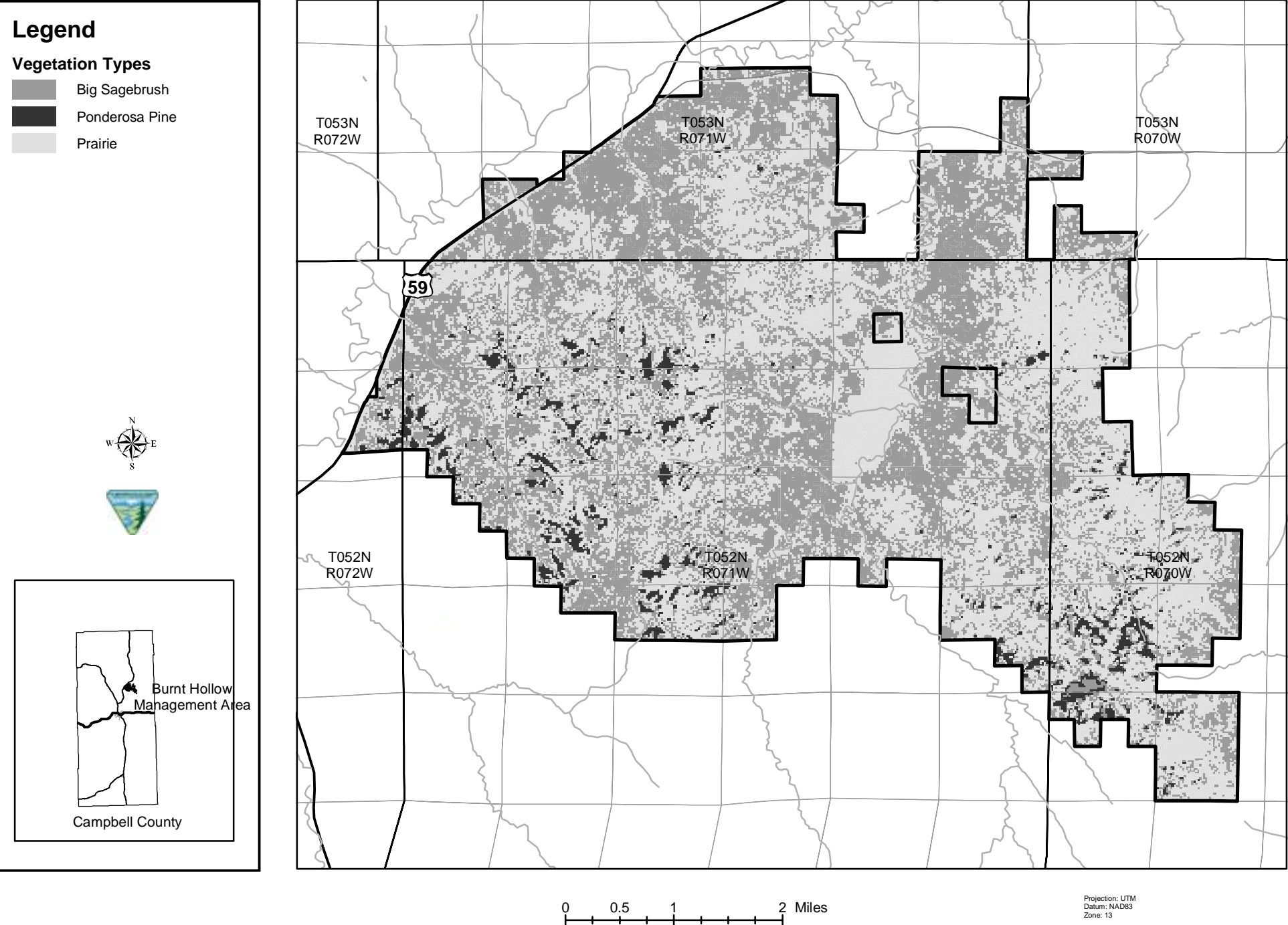
* Includes some area outside of the grazing allotment.

Much of the area adjacent to Cow Creek has been seeded to pasture grasses, resulting in the early seral rating. Cow Creek does not support the native species that would typically be found along an intermittent stream. The other area of early seral stage is a small parcel in the southwest corner that burned in a wildfire.

3.9 Water Resources

There are approximately 70 miles of intermittent streams within the BHMA. Cedar Draw, Cow Creek, Hells Canyon Draw, and Provant Creek are the primary drainages. These streams support plains cottonwoods along segments of their banks. The drainages have been rated as non-functional in part due to lack of bank stabilizing vegetation (sedges, rushes, and willows), juniper encroachment, and lack of cottonwood regeneration. The streams flow northward to the Little Powder River. There are several springs which support wetland vegetation. Nine water wells and several small reservoirs

Figure 3.3 Vegetation Communities within the Burnt Hollow Management Area, Campbell County, Wyoming.



have been developed for livestock watering.

3.10 Wildlife

The BHMA contains a mosaic of prairie (52%), shrublands (42%), and forest (4%) habitats supporting a diversity of wildlife species. Forest cover is predominant on the hilltops and extending down the drainages. Shrublands are interspersed with prairie habitats on the slopes and at the lower elevations. Many of these vegetation types are in older successional stages. The drainages have been rated as non-functional in part due to lack of bank stabilizing vegetation (sedges, rushes, and willows), juniper encroachment, and lack of cottonwood regeneration. Juniper, ponderosa pine, and sagebrush density are higher than was likely the prehistoric average.

Mule deer (*Odocoileus hemionus*) is the most common big game species within the BHMA while white-tailed deer (*O. virginianus*), American pronghorn (*Antilocapra americana*), and elk (*Cervus elaphus*) are also present. Mule deer utilize all habitats within the BHMA. Historically, the mule deer harvest was tightly controlled resulting in trophy class mule deer bucks. White-tailed deer and pronghorn primarily utilize the low elevation habitats, and are uncommon within the forest areas. A small population of elk inhabits the Little Powder River watershed including the BHMA. Common game birds include greater sage grouse (*Centrocercus urophasianus*) and wild turkey (*Meleagris gallopavo*). Wild turkeys utilize the forest, shrubland and grass/prairie habitats, while sage grouse reside primarily within the sagebrush and grassland habitats. Two sage grouse leks have been documented in the BHMA vicinity, Saddlesore located south of the Cow Creek County Road and Wallace to the southeast of the Cow Creek Breaks area. Saddlesore is an active lek, while the status of Wallace is unknown.

Sensitive species potentially inhabiting the prairie grasslands include Baird's sparrow (*Ammodramus bairdii*), burrowing owl (*Athene cunicularia*), ferruginous hawk (*Buteo regalis*), long-billed curlew (*Numenius americanus*), and swift fox (*Vulpes velox*). Shrubland habitats may support the following sensitive species: Brewer's sparrow (*Spizella breweri*), burrowing owl, ferruginous hawk, greater sage grouse, loggerhead shrike (*Lanius ludovicianus*), sage sparrow (*Amphispiza billneata*), sage thrasher (*Oreoscoptes montanus*). The ponderosa pine/juniper forest may support the sensitive species northern goshawk (*Accipiter gentiles*).

The Wyoming Natural Diversity Database (WYNDD) contains records of three BLM sensitive species in the Little Powder River watershed; the species are burrowing owl, greater sage grouse, and northern leopard frog. Sage grouse droppings have been identified within the BHMA. Leopard frogs have been documented within stock reservoirs in the BHMA. The BLM database has documented raptor nests, bald eagle winter roosts, black-tailed prairie dog colonies, and greater sage grouse leks within the Little Powder River watershed, however none occur within the BHMA.

Threatened, endangered, and proposed species possibly occurring within the Little Powder River watershed include the bald eagle (*Haliaeetus leucocephalus*), black-footed ferret (*Mustela nigripes*), mountain plover (*Chardrius montanus*), and Ute ladies'-tresses

orchid (*Spiranthes diluvialis*). The WYNDD and BLM databases do not contain any observations for any of these species within the BHMA.

Cottonwoods and ponderosa pines within the BHMA are capable of supporting nesting or roosting bald eagles, however a reliable prey base is not present. The Little Powder River does not sustain a reliable fishery and often does not flow year-round. Cattle are the primary livestock class grazed within and surrounding the BHMA; roost sites within the Powder River Basin have often been associated with large sheep herds (Anderson and Patterson 1988). There are no prairie dog colonies within the BHMA to support black-footed ferrets. The drainages within the BHMA are all ephemeral and do not provide Ute ladies'-tresses habitat. A WYNDD (2003) potential distribution model also indicates Ute ladies'-tresses orchid habitat would be unlikely within the BHMA, potential range is limited to the southern third of Campbell County.

There is potential nesting habitat for mountain plovers within the prairie communities that consist of sparse/dry grasslands and the sagebrush communities which have low shrub densities. Where these vegetation types and areas of low slope coincide are primarily along the drainages.